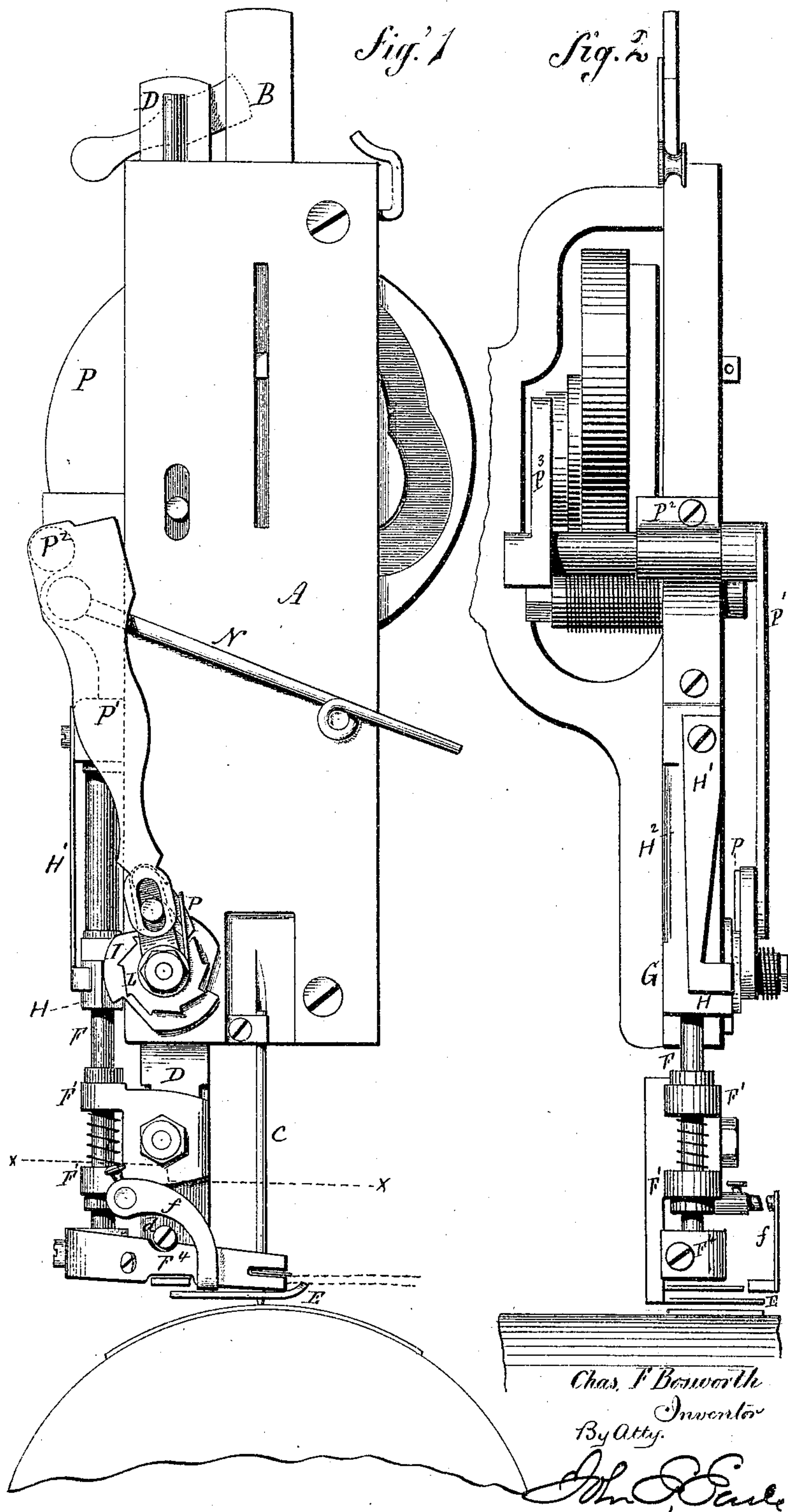


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Sewing-Machines.

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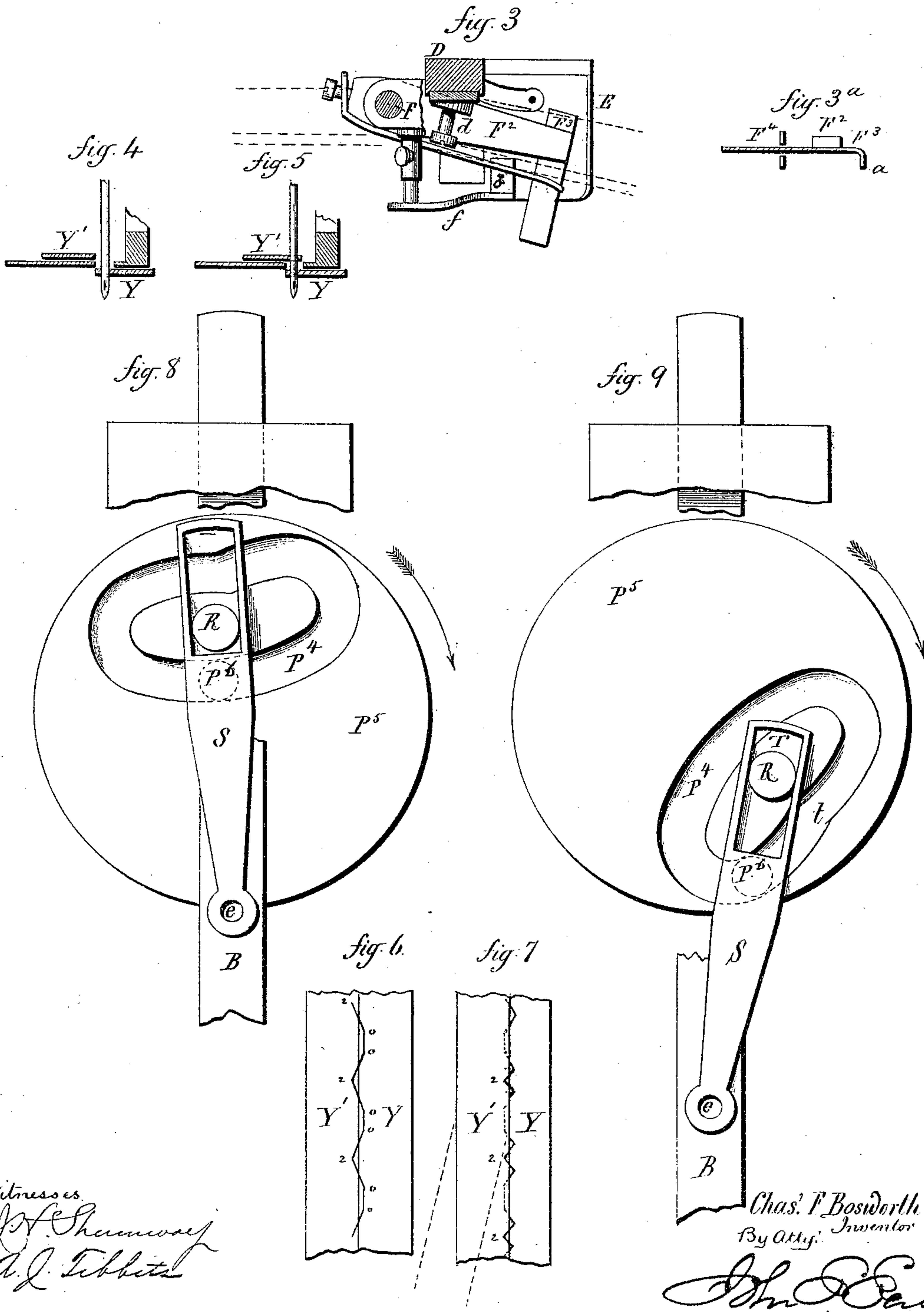
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# UNITED STATES PATENT OFFICE.

CHARLES F. BOSWORTH, OF MILFORD, CONNECTICUT.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 151,351, dated May 26, 1874; application filed April 22, 1874.

*To all whom it may concern:*

Be it known that I, CHARLES F. BOSWORTH, of Milford, in the county of New Haven and State of Connecticut, have invented a new Improvement in Sewing-Machines; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a front view of the head of the machine; Fig. 2, a side view; Fig. 3, a section on line *x x*; Figs. 4 and 5, detached views; and Figs. 6 and 7, diagrams illustrating the operation of the first part of the invention; and, in Figs. 8 and 9, diagrams illustrating the second part of the invention.

This invention relates to an improvement in sewing-machines designed to be used in the manufacture of head-coverings from narrow strips of braid or like material, but applicable to the sewing of like material for other purposes, parts of which are applicable to that class of sewing-machines generally which employ a vertical needle-bar.

The peculiar stitch which this machine is designed to make in the sewing of straw braid is the subject of an application for Letters Patent which I have filed in even date herewith, and which consists in turning the one line of braid that is being stitched to another out of the path of the needle for one or more stitches, then bringing the braid back again for a single stitch or more through both braids, thus leaving the principal portion of the thread between the two braids, the stitch which secures the braids appearing only over the edge of the outside braid. This is illustrated in Figs. 6 and 7, Fig. 6 showing the two braids *Y Y'* as drawn apart laterally, *o o* being the stitches which are taken through the under braid *Y* only, and *Q*, the stitches which are taken through both braids; but when in their natural position the work has the appearance as seen in Fig. 7, the stitches all being in the same line, the thread from stitch *Q* passing directly over the edge and back under to the stitch *o*. This is produced by turning the outside braid *Y'* out of the path of the needle so soon as the stitch is made, as denoted in broken lines, Fig. 7, so

that the needle in passing down for the next stitch will not take the outside braid.

The first part of this invention, by which this peculiar stitch is made, consists in combining with the presser-foot and stitching mechanism a holder or guide for the line of braid, to which a transverse reciprocating or vibratory movement is imparted to present the braid in the path of the needle at the proper time for the stitch, and to take it away so soon as the stitch, or the required number of stitches, shall be made through it, and hold it out of the path of the needle until the stitch or the required number of stitches have been made through the under or other braid, thus presenting the braid into the path of the needle for alternate stitches. The second part of the invention, which relates to the movement of the needle-bar designed to give it a stand still at or near the lower extreme, consists in combining with a vertically-guided arm a pitman by which the said arm is connected to a crank-pin, the said crank-pin working in a slot in the pitman, combined with a cam-groove around the said crank-pin in which a stationary stud on the pitman runs, the said cam-groove and crank-pin together operating to give the desired stand for the needle-bar at or near its lower extreme, as more fully hereinafter described.

*A* is the head, within which the vertical reciprocating needle-bar *B* is arranged, in substantially the usual manner, carrying the needle *C* at its lower end. *D* is the presser-foot bar arranged in substantially the usual manner and carrying in its lower end the presser-foot *E*. *F* is a vertical shaft hung in bearings *F'*, attached to the presser-foot *E*, so that when the presser-foot is raised this shaft will rise with it. The upper end of this shaft *F* extends into a sleeve, *G*, the sleeve hung in a bearing, *H*<sup>2</sup>, which is secured to the head, the sleeve *G* having only a rotary movement, and that axially, with the shaft *F*, which is splined into the sleeve *G*, so as to turn with the said sleeve, but so as to have also a vertical movement. An arm, *H*, of this sleeve extends forward, and on this a spring, *H'*, bears, tending to press the arm toward the needle. On the head, forward of the arm *H*, a cam, *I*, is hung, which works against this arm *H* of the sleeve, the projec-



tions of the cam serving to force the arm H away from the needle, and turn the shaft F accordingly. The depressions in the cam allow the arm H to fall toward the needle, and the shaft to be turned accordingly. To the lower end of the shaft F the mechanism for carrying the braid to be stitched is attached, and this turning of the shaft F is designed to present and take away the braid at the proper times. To do this an intermittent movement is imparted to the cam I by means of a ratchet, L, and a pawl, P, actuated through a lever, P<sup>1</sup>, hung above in a bearing, P<sup>2</sup>, by a cam working against an arm, P<sup>3</sup>, on said shaft. The motion of the lever P<sup>1</sup> is vibratory from its bearing P<sup>2</sup>, and at each revolution of the shaft makes one full vibration, and consequently turns the ratchet L one notch, and with it the cam I. As here represented, the cam is made with three projections and three depressions or escapements, and the stitch to be produced is two stitches in the under braid only, and the third to take also the upper braid, or braid being stitched; then two stitches in the under braid, and the next in both, and so on, alternating. Therefore two reciprocations of the lever P<sup>1</sup> will be required for each projection, and one for each escapement, as shown. The projections being concentric with the axis of the cam, the shaft F will stand still while the arm H is being passed, which is the position shown in Fig. 1, and which holds the braid Y' away from the needle, as seen in Fig. 4; but so soon as the cam presents the escapement or depression, then the arm falls off and turns the shaft accordingly, bringing the braid Y' into the line of the needle, as seen in Fig. 5.

It will be understood that the number of projections and escapements on the cam may be varied, as also their extent, according to the nature of the work to be done.

The holder which carries the braid is shown in plan view, Fig. 3, and as turned out of the path of the needle, the line of braid denoted in broken lines. From the shaft F an arm, F<sup>2</sup>, extends forward, and has upon its forward end a transverse arm, F<sup>3</sup>, (seen in Fig. 3<sup>a</sup>), the inside end of the arm F<sup>3</sup> turning down, as at *a*. Beside the arm F<sup>2</sup> is a spring, F<sup>4</sup>, its forward end lying below the arm F<sup>3</sup>, (represented as forked onto the arm F<sup>3</sup>), and between the downward projection *a* and the end of this spring F<sup>4</sup> the braid is placed, and over the presser-foot, as denoted in broken lines, Fig. 1. The body of the braid to which this braid is to be stitched runs below the presser-foot in like manner as work in ordinary sewing. This arm F<sup>2</sup> turns with the shaft F, so as to present and remove the braid, as before described.

To adjust the movement toward the needle, so that the needle may take a greater or less distance onto the braid, an adjusting-screw, *d*, is attached to the arm F<sup>2</sup>, to strike the presser-foot when it has reached the desired point beneath the needle.

It is desirable to form a bearing for the out-

side edge of the braid, around which it may be turned, so as not to disturb the already-formed stitches. For this purpose an arm, *f*, is attached to the presser-foot, or at some point stationary thereon, extending down, and turned transversely, as at *b*, Fig. 3, so as to lie against the outer edge of the braid, and around which the braid will be bent, as denoted in broken lines, and is made adjustable for different widths of braid, as shown in Fig. 3, or other convenient manner. The usual take-up M or any other for the thread, is employed. This completes the first part of my invention.

I will now proceed to the description of the second part of my invention, which is illustrated in Figs. 8 and 9. P<sup>5</sup> is a disk which is attached to the driving-shaft, and revolves with it. R is the crank-pin, made stationary in the said disk, and from this a connecting-rod, S, extends and is hung at *e* to the needle-bar B. The crank-pin works in a slot, T, in the connecting-rod, so that between the two extremes of the slot the said crank-pin will impart no movement to the needle-bar. Around the crank-pin is a cam-groove, P<sup>4</sup>, in which a stud, P<sup>6</sup>, denoted in broken lines, stationary on the connecting-rod, runs, the revolution of the disk P<sup>5</sup> denoted by the arrow; and the position in Fig. 8 is the highest, and that in Fig. 9 the lowest extreme movements of the needle-bar. Starting from the highest point, Fig. 8, the disk revolving, the crank-pin carries the connecting-rod over to the right. The stud P<sup>6</sup>, at the same time, following the inside groove of the cam, runs down in advance of the movement of the connecting-rod by so much as the eccentricity of the cam around the crank-pin, thus making the descent of the needle-bar rapid until arrived at the lowest point, when a short turn is made in the groove and the stud P<sup>6</sup> passes into the groove outside the crank-pin. This part of groove, if perfectly concentric with the axis of the shaft around which the disk P<sup>5</sup> revolves, would hold the needle-bar stationary until the stud had reached the other extreme; but it is desirable that a slight rise should be given to the needle, so as to open the thread-loop to the passage of the shuttle, and there remain substantially stationary for a time; hence I make the groove P<sup>4</sup> of the cam outside of the crank-pin, with a slight depression, as at *t*, this depression being the extent to which it is desired to raise the needle. The disk P<sup>5</sup> continuing its revolution, the stud P<sup>6</sup> still follows the groove, and rises only to the extent of this depression in the cam, and then continues its course substantially concentric with the axis of the disk P<sup>5</sup>, to the other extreme of the cam—that is, stationary, or substantially so. Then it passes to the other side of the cam, and rises quickly to the other extreme, as seen in Fig. 8. Thus the movement of the needle up and down is made so very quick that time is given for the free passage of the shuttle.

I have represented the crank-pin as attached to or part of the cam-disk; but they may be



separate and on opposite sides of the connecting-rod, but they must move together and be substantially one.

I claim as my invention—

1. In combination with a stitch-forming mechanism, a guide, such substantially as described, to carry the strip to be sewed, the said guide having a reciprocating or vibratory movement, to alternately present the strip it carries to the needle and remove it therefrom, substantially as set forth.

2. In combination with a stitch-forming mechanism, a guide, such substantially as described, to carry the strip to be sewed, the said guide having a reciprocating or vibratory movement, to alternately present the strip it carries to the needle and remove it therefrom, and the arm or stop *b*, substantially as and for the purpose specified.

3. In combination with a stitch-forming mechanism, the guide  $F^3 a$ , having a reciprocating or vibratory movement to and from the path of the needle, and the spring  $F^4$ , to accommodate different widths of strips carried by said guide, substantially as set forth.

4. In combination with a stitch-forming

mechanism, the vertical shaft *F*, upon which the guide  $F^3 a$  is hung, the said shaft having an intermittent oscillating movement, to alternately present the said guide to and remove it from the path of the needle, substantially as set forth.

5. In combination with a stitch-forming mechanism, the vertical shaft *F*, upon which the guide  $F^3 a$  is hung, the cam *I* having an intermittent movement imparted to it from the moving parts of the machine, to turn the said shaft and guide to and from the path of the needle, the sleeve *H*, which engages the said shaft, as described, and the spring  $H'$ , substantially as set forth.

6. In combination with the guided needle-bar, the slotted connecting-rod *S*, provided with the stud  $P^6$ , and the disk  $P^5$  provided with the groove  $P^4$  about the crank-pin, the stud moving in said groove, substantially as specified.

CHARLES F. BOSWORTH.

Witnesses:

A. J. TIBBITS,

J. H. SHUMWAY.